

Historic, Archive Document

Do not assume content reflects current scientific knowledge, policies, or practices.

Reserve

UNITED STATES DEPARTMENT OF AGRICULTURE
BUREAU OF HOME ECONOMICS
WASHINGTON, D. C.

VITAMINS A, B, AND C

A Table showing their distribution in food materials and a selected list
of references to literature reporting their occurrence and
the technique of vitamin studies

Sybil L. Smith
Specialist in Biochemistry, Office of Experiment Stations,
United States Department of Agriculture

UNITED STATES DEPARTMENT OF AGRICULTURE

U. S. BUREAU OF HOME ECONOMICS

WASHINGTON, D. C.

VITAMINS A, B, AND C

A Table showing their distribution in food materials and a selected list
of references to literature reporting their occurrence and
the technique of vitamin studies

Sybil L. Smith

Specialist in Biochemistry, Office of Experiment Stations,
United States Department of Agriculture

VITAMINS A, B, AND C

Sybil L. Smith

Specialist in Biochemistry, Office of Experiment Stations,
United States Department of Agriculture

The Distribution of Vitamins A, B, and C in Food Materials

The accompanying table of the distribution of vitamins A, B, and C in food materials is a revision and extension of the table in the monograph of the American Chemical Society entitled "The Vitamins."¹ A slightly different grouping of the food materials has been followed to conform with the classification in Farmers' Bulletin 1313. It has been thought inadvisable at the present time to extend the table to include the antirachitic vitamin (vitamin D) or the reproductive vitamin (vitamin E), but attention is called to cod-liver oil and egg yolk as the richest known sources of vitamin D and green lettuce and wheat embryo as particularly rich in vitamin E.

In the use of the table it should always be kept in mind that the values assigned are purely qualitative. According to the key of symbols employed, a double + does not indicate that the material is twice as rich in a particular vitamin as one to which a single + has been assigned but simply that according to present knowledge it is a somewhat better source of the vitamin in question. It should also be remembered that early as well as recent work has been included in the compilation and that the technique employed in much of the earlier work is open to criticism as to purity of the basal ration, previous feeding of the experimental animals, length of the experimental period, etc. Some of the earlier studies on vitamin A are complicated by the presence or absence of vitamin D, on vitamin B by failure to prevent the rats from having access to their excreta, and on vitamin C by inadequacy of the basal ration. Distinct variations in the vitamin content of the same natural material, whether of

¹ Sherman, H. C. and Smith, S. L. The Vitamins. 1922. Chemical Catalog Co., New York City.

plant or animal origin, may also occur as the result of environmental conditions and food supply. For these reasons even the qualitative values assigned may in some cases be open to question and subject to change.

Unless otherwise noted it is to be understood that the tests upon which the values given are based have been conducted upon the food material in its original state or, in the case of many of the vitamin B tests, dried at temperatures sufficiently low to prevent any possible destruction of the vitamin. Too little work has been done on the effect of various manipulative processes on the vitamin content of foods to place great dependence upon the values reported for cooked, canned, and dehydrated foods but they have been included to indicate in a general way the relative stability of the three vitamins and to suggest the desirability of much more work along these lines.

In this table the signs used have the following meaning:

+ indicates that the food contains the vitamin.

++ indicates that the food is a good source of the vitamin.

+++ indicates that the food is an excellent source of the vitamin.

- indicates that the food contains no appreciable amount of the vitamin.

? indicates doubt as to presence or amount.

* indicates that evidence is lacking or appears insufficient.

GROUP I. FRUITS AND VEGETABLES

Fruits	Vitamin		Vitamin		Vitamin
	A		B		C
Apples, raw, fresh.....	+	...	+	...	++
" , raw, dried.....	*	...	*	...	- to +
" , canned commercially.....	*	...	*	...	++
" , home-cooked.....	*	...	*	...	+ to ++
Avocados (alligator pears)	++	...	++	...	*
Bananas, raw, fresh.....	+ to ++	...	+	...	++
" , raw, dried.....	*	...	*	...	- to +
" , cooked.....	*	...	*	...	- to +

GROUP I. FRUITS AND VEGETABLES (Continued)

Fruits	Vitamin A	Vitamin B	Vitamin C
Chico (see Sapodilla)
Cranberry juice.....	*	*	+
Grapefruit juice, fresh.....	-?	++	++
" " , dried	*	++	++
Grape juice, fresh.....	*	*	+
" " , commercial	*	+	*
" " , dried	*	*	-
Guava.....	*	*	++
Lemons, cold storage	*	*	+++
Lemon juice, fresh.....	-	++	+++
" " , frozen (storage)	*	*	++
" " , concentrated.....	*	*	+++
" " , dried	*	++	+++
Lemon peel	+?	*	*
Lime juice, fresh	*	+	+
" " , concentrated.....	*	*	+
Mangoes, dried	*	*	+
Mulberries.....	*	*	+
Oranges, cold storage	*	*	+++
" , canned	*	*	+++
Orange juice, fresh	+ to ++	++	+++
" " , frozen, stored	*	*	++
" " , concentrated	++	*	+++
" " , dried	*	++	+++
Orange marmalade	- to +	-?	- to +
Orange peel, inner	*	+	*
" " , outer	+	*	++
" peel oil	- to ++	*	*
Papaya	++	+	++
Peaches	*	*	+ to ++
Pears	*	+	*
Persimmons, Chinese	*	-	+
Pineapple, raw, fresh	++	++	+++
" , canned	++	++	++
Prunes, dried	++	+	-
Raisins	-	+	-
Raspberries, fresh	*	*	+++
" , canned	*	*	+++
Raspberry juice, dried	*	*	-
Sapodilla (chico)	++	*	++
Strawberries	*	+	++
Tamarind, dried	*	*	+
Tangerines	*	*	+++

GROUP I. FRUITS AND VEGETABLES (Continued)

Vegetables	Vitamin A	Vitamin B	Vitamin C
Artichokes, globe, fresh.....	*	+	*
" " " , canned.....	++?	+	*
Asparagus.....	*	+++	*
Bamboo shoots.....	*	+	*
Beans, kidney.....	+	+++	*
" , mung.....	+	++	*
" , " , sprouted.....	+	++	++
" , navy.....	+	+++	++
" , soy.....	+	+++	-
" , sprouted.....	*	*	-
" , string, fresh.....	++	++	++
" , " , canned.....	*	*	+
Beets, root.....	-	+	+
" , leaves.....	++	++	*
" , stems.....	*	++	*
Cabbage, green, fresh.....	+ to ++	++	+++
" , white, ".....	- to +	++	+++
" , old.....	*	*	+
" , green, dried.....	+ to ++	++	+
" , " , " , stored.....	*	*	- to +
" , head, canned.....	+	*	++
" , " , cooked.....	+	++	+
Carrots, raw, young.....	++	++	++
" , " , old.....	++	++	+
" , cooked, young.....	++	+	+
" , " , old.....	++	+	- to +
Cauliflower.....	+	++	++
" , boiled.....	*	*	+
Celery, stems.....	- to +	++	*
" , leaves, blanched.....	+	*	*
" , " , green.....	++	*	*
Chard, Swiss.....	++	+	*
Chayotes.....	++	*	*
Cowpeas, fresh, boiled.....	*	++	*
" , germinated.....	*	*	+++
" , dried.....	++	*	*
Cress.....	*	*	+
Cucumbers.....	- to +	+	++?
Dandelion greens.....	++	+	+
Dasheens.....	-?	++	+
Eggplant.....	-	++	*
Endive.....	+	*	+
Kohlrabi.....	*	*	+
Lentils.....	++	++	-
" , sprouted.....	*	++	++
Lettuce, whole head.....	++	++	++
Mangels.....	-	-	+

GROUP I. FRUITS AND VEGETABLES (Continued)

Vegetables	Vitamin A	Vitamin B	Vitamin C
Mushrooms, fresh	*	*	+
" , dried	-	++	-
Okra	*	+++	*
Onions, raw	- to +	++	++
" , cooked	- to +	++	+
Parsley	*	++	*
Parsnips	-?	++	*
Peas, green, fresh, raw	++	+++	+++
" , fresh, home-cooked	++	+++	++
" , " , canned	++	+++	++
Pepper, red (Capsicum)	+	*	*
Potatoes, sweet	+ to ++	+	++
" , white, raw	+	++	++
" , " , boiled 15 min.	+	++	++
" , " , boiled 1 hr.	+	++	+
" , " , baked	+	++	+
" , " , steamed and dried ..	*	*	+
Pumpkin	+	+	+
Radishes	-	+	*
Rhubarb	*	*	+
Rutabagas, fresh	-?	++	++
" , cold storage	*	*	++
" , juice	*	++	+++
" , " , frozen, stored 15 mos.	*	*	-
" , " , heated	*	*	++
Spinach, fresh, raw	+++	+++	++
" , dried	+++	++	*
" , home-cooked	+++	*	+
" , commercially canned	+++	*	++
Squash, Hubbard	++	*	*
" , summer (see Vegetable marrow).			
Swedes (see Rutabagas)			
Tomatoes, raw	++	+++	+++
" , canned	++	+++	+++
" , dried	++	+++	++
Turnips (see also Mangels, Rutabagas).	-?	++	++
Vegetable marrow, juice	*	*	++

GROUP II. FOODS DEPENDENT ON FOR
EFFICIENT PROTEIN

Vitamin
A

Vitamin
B

Vitamin
C

Eggs

Eggs, whole, fresh	++	...	+	...	-
" , " , cold storage	++	...	*	...	*
Egg white	-	...	-	...	-
" yolk	+++	...	++	...	-
Eggs, duck's, salted	++	...	-	...	*

Fish and sea food

Fish, fat (such as herring, salmon)...	+	...	+	...	*
" , lean (such as cod, haddock)	- to +	...	+	...	*
" , liver	++ to +++	...	*	...	*
" , roe, fresh and dried	++	...	++	...	*
Oysters	*	...	*	...	+
Shrimps	+	...	*	...	*

Meat

Edible viscera

Brains	+	...	++	...	-?
Heart	+	...	+	...	+
Kidney	+	...	++	...	+
Liver	++ to +++	...	++	...	+
Lungs	++	...	*	...	*
Sweetbreads	+	...	+	...	*
Muscle (lean meat), beef	- to +	...	- to +	...	- to +
" " " , poultry	- to +	...	- to +	...	*
" " " , lamb or mutton	- to +	...	- to +	...	*
" " " , pork	- to +	...	+	...	*
Meat extract	-	...	-?	...	-
" juice, beef	*	...	+	...	- to +

Milk and dairy products

Milk, cow's, whole, fresh	+++	...	++	...	+
" , " , " , boiled	+++	...	++	...	- to +
" , " , " , condensed	+++	...	++	...	+
" , " , " , dried	+++	...	++	...	- to +
" , " , " , evaporated	+++	...	++	...	- to +
" , " , " , pasteurized	+++	...	++	...	- to +
" , " , skim, fresh	+	...	++	...	+
" , " , " , dried	+	...	++	...	- to +
" , " , colostrum	+++	...	*	...	*
" , goat's	*	...	*	...	+
" , human	++	...	+	...	+
Buttermilk	+	...	++	...	- to +
Lactic-acid milk	*	...	*	...	+
Cheese	++	...	*	...	*
Cottage cheese	+	...	*	...	*

GROUP III. CEREALS AND CEREAL PRODUCTS	Vitamin A	Vitamin B	Vitamin C
Barley, unhusked	+?	++	-
" , husked	*	++	-
" , sprouted	*	*	+
" (see also Malt)			
Bread, white, water	?	+	-
" , " , milk	+	+	- to +
" , whole wheat, water	+	++	-
" , " , " , milk	++	++	- to +
Corn, whole, white	-	++	-
" , " , yellow	+	++	-
" , white, embryo	-	++	-
" , yellow, embryo	+	+++	-
" , " , endosperm	*	-	*
" , bran	*	-	*
Cottonseed meal	+	++	*
Flour (see Wheat)			
Malt, green	+	++	++
" , kilned	-	++	-
" , extract	*	+	*
Millet seed	++	++	*
Oats	- to +	++	-
" , sprouted	*	*	+
Rice, polished	-	-	-
" , whole	+	++	-
" , wild	+?	++	-
Rye, whole	+?	++	-
Sterch	-	-	-
Wheat, bran	+	++	-
" , embryo	++	+++	-
" , " , extract	*	+++	*
" , endosperm	-	+	-
" , flour, white	-	+	-
" , middlings, commercial	*	++	-
" , whole	+	++	-
GROUP IV. SUGARS			
Glucose	-	-	-
Honey	-	+	-
Molasses	-	+	-
Sugar	-	-	-

GROUP V. FATS AND FAT-RICH FOODS

Vitamin
A

Vitamin
B

Vitamin
C

Fats and oils of animal origin

Beef fat	+	...	-	...	-
Butter	+++	...	-	...	-
Cream	+++	...	++	...	- to +
Cod liver (and other fish liver) oils	+++	...	-	...	-
Herring oil	++	...	-	...	-
Horse fat	+	...	-	...	-
Lard	- to +	...	-	...	-
Margarin, oleo	+ to ++	...	-	...	-
Mutton fat	+	...	-	...	-
Oleo oil	+	...	-	...	-
Pig kidney fat	++	...	-	...	-
Seal oil	+	...	-	...	-
Whale oil	++	...	-	...	-

Fats and oils of vegetable origin

Almond oil	-	...	-	...	-
Cocoa butter	-	...	-	...	-
Coconut oil	-	...	-	...	-
Corn oil, yellow	+	...	-	...	-
Cottonseed oil	+	...	-	...	-
" " , hydrogenated.....	-	...	-	...	-
Lemon oil	+	...	-	...	-
Linseed oil	+	...	-	...	-
Margarin, nut	-	...	-	...	-
Olive oil	- to +	...	-	...	-
Orange peel oil	++	...	-	...	-
Palm oil	++	...	-	...	-
" kernel oil	+	...	-	...	-
Peanut oil	+	...	-	...	-
Sesame oil	-	...	-	...	-
Soybean oil	+	...	-	...	-

Nuts

Almonds	+	...	++	...	*
Beechnuts	*	...	++	...	*
Brazil nuts	+	...	++	...	*
Butternuts	+	...	*	...	*
Chestnuts	*	...	++	...	*
Coconut	+	...	++	...	*
Filberts	*	...	++	...	*
Hickory nuts	*	...	++	...	*
Peanuts	+	...	++	...	*
Pecans.....	+	...	++	...	*
Pine nuts	*	...	++	...	*
Walnuts, black	*	...	++	...	*
" , English	+	...	++	...	*

MISCELLANEOUS

Yeast	*	...	+++	...	-
" , extract	-	...	+++	...	-
" , fat	+	...	*	...	*

SELECTED LIST OF REFERENCES TO LITERATURE REPORTING THE OCCURRENCE OF VITAMINS A, B, AND C

As an aid to further work on the quantitative occurrence of the vitamins as well as in the interpretation of the values assigned in the preceding table, a partial list of literature references has been prepared. As far as possible the most recent reference has been selected if this appears authoritative and if the original article contains, as is usually the case, a review of earlier literature on the subject. In some cases it has been considered advisable to include more than one reference. For the convenience of research workers at the State Experiment Stations, references are included to abstracts of the literature in the Experiment Station Record (E. S. R.).

LITERATURE REFERENCES ON THE OCCURRENCE OF VITAMIN A

ALMONDS

Coward, K. H., and Drummond, J. C. 1920. Biochem. Jour. 14: 665-667.
E. S. R. 44: 765.

ALMOND OIL

Osborne, T. B., and Mendel, L. B. 1914. Jour. Biol. Chem. 17: 401-408.
E. S. R. 31: 560.

APPLES:

Munsell, H. E. 1924. Diss. Columbia Univ.

ARTICHOKES, GLOBE

Morgan, A. F., and Stephenson, H. D. 1923. Amer. Jour. Physiol. 65:
491-502. E.S.R. 50: 462.

AVOCADO (ALLIGATOR PEAR)

Jansen, B. C. P., and Donath, W. F. 1924. Meded. Burgerl. Geneesk.
Dienst Nederland. Indië 1: 46-98. E. S. R. 52: 64.

BACON

Sherman, H. C. Food Products. 2nd ed. 1924.

BANANAS. See APPLES

BARLEY

- (1) Steenbock, H., Kent, H. E., and Gross, E. G. 1918. Jour. Biol. Cher. 35: 61-74. E. S. R. 39: 666.
- (2) Southgate, H. W. 1924. Biochem. Jour. 18: 769-776. E. S. R. 52: 365.
- (3) See BACON

BEANS, KIDNEY. See BACON

BEANS, MUNG

Med. Research Council [Gt. Brit.] Spec. Rpt. Ser. No. 38. 2nd ed. 1924.

BEANS, NAVY. See BACON.

BEANS, SOY

- (1) Osborne, T. B., and Mendel, L. B. 1917. Jour. Biol. Chem. 32:
369-387. E. S. R. 39: 667.
- (2) See AVOCADO

BEANS, STRING. See APPLES

BEEF FAT

Steenbock, H., Sell, M. T., and Buell, M. V. 1921. Jour. Biol. Chem. 47: 89-109. E. S. R. 46: 61.

BEEF MUSCLE

Hoagland, R., and Snider, G. G. 1925. Jour. Agr. Research 31: 201-221. E. S. R.

BEET LEAVES. See BACON

BEET ROOT

Steenbock, H., and Gross, E. G. 1919. Jour. Biol. Chem. 40: 501-532. E. S. R. 42: 460.

BRAINS. See BACON

BRAZIL NUTS. See ALMONDS

BREAD

Sherman, H. C., and Smith, S. L. The Vitamins. 1922.

BUTTER

(1) See BEEF FAT

(2) Drummond, J. C., Coward, K. H., and Watson, A. F. 1921. Biochem. Jour. 15: 540-552. E. S. R. 46: 357.

(3) See APPLES

BUTTERMILK. See BUTTER (2)

BUTTERNUTS. See ALMONDS

CABBAGE

(1) Osborne, T. B., and Mendel, L. B. 1920. Jour. Biol. Chem. 41: 549-565. E. S. R. 43: 165.

(2) Coward, K. H., and Drummond, J. C. 1921. Biochem. Jour. 15: 530-539. E. S. R. 46: 356.

(3) Steenbock, H., and Sell, M. T. 1922. Jour. Biol. Chem. 51: 63-76. E. S. R. 47: 464.

CAPSICUM (RED PEPPER)

Coward, K. H. 1923. Biochem. Jour. 17: 145-156. E. S. R. 49: 768.

CARROTS

(1) See CABBAGE (1)

(2) See APPLES

CAULIFLOWER

(1) See CAPSICUM

(2) See BACON

CELERY. See BACON

CHARD, SWISS

Steenbock, H., and Gross, E. G. 1920. Jour. Biol. Chem. 41: 149-162. E. S. R. 42: 556.

CHAYOTES. See AVOCADO

CHEESE. See BACON

CHICO (SAFODILLA). See AVOCADO

COCONUT OIL

Jansen, B. C. P. 1918. Meded. Geneesk. Lab. Weltevreden [Dutch East Indies]. 3 Ser. A: 78-94. E. S. R. 41: 363.

COCONUT PRESS CAKE

- (1) Johns, C. O., Finks, A. J., and Paul, M. S. 1919. Jour. Biol. Chem. 37: 497-502. E. S. R. 41: 262.

(2) See AVOCADO

COD LIVER OIL

- (1) See BEEF FAT

- (2) Drummond, J. C., and Zilva, S. S. 1922. Jour. Soc. Chem. Indus. 41: 280T-284T. E. S. R. 48: 64.

COD ROE

- Hjort, J. 1922. Proc. Roy. Soc. [London]. Ser. B. 93:440-449.
E. S. R. 47: 661.

COLOSTRUM. See BUTTER (2)

CORN

- Steenbock, H., and Boutwell, P. W. 1920. Jour. Biol. Chem. 41: 81-96.
E. S. R. 42: 461.

CORN OIL

- Drummond, J. C. and Zilva, S. S. 1922. Jour. Soc. Chem. Indus. 41: 125T-127T. E. S. R. 49: 59.

COTTAGE CHEESE. See BREAD

COTTONSEED OIL

- Drummond, J. C., and Coward, K. H. 1920. Biochem. Jour. 14: 668-677.
E. S. R. 44: 765.

COTTONSEED OIL, HYDROGENATED

- Halliburton, W. D., and Drummond, J. C. 1917. Jour. Physiol. 51: 235-251.
E. S. R. 38: 265.

COTTONSEED MEAL

- Osborne, T. B., and Mendel, L. B. 1917. Jour. Biol. Chem. 29: 289-317.
E. S. R. 37: 60.

COWPEAS. See AVOCADO

CREAM

- Wisconsin Sta. Bul. 352. 1923. 14-15. E. S. R. 49: 664.

CUCUMBER

- (1) See CAPSICUM

- (2) See AVOCADO

DANDELION. See BREAD

DASHEEN. See BEET ROOT

EGGS, DUCK'S

- (1) See AVOCADO

- (2) (Chinese preserved "pidan.") Tso, E. 1925. Proc. Soc. Expt. Biol. and Med. 22: 263-265. E. S. R. 53: 459.

EGGS, HEN'S, FRESH

- Murphy, J. C., and Jones, D. B. 1924. Jour. Agr. Research. [U.S.] 29:253-257.
E. S. R. 52: 664.

EGGS, HEN'S, COLD STORAGE

- Jones, D. B., Murphy, J. C., and Moeller, O. 1925. Amer. Jour. Physiol. 71: 265-273. E. S. R. 52: 664.

EGG WHITE (HEN'S). See APPLES

EGG YOLK (HEN'S). See APPLES

ENDIVE. See BREAD

FISH

- (1) Drummond, J. C. 1918. Jour. Physiol. 52: 95-109. E. S. R. 40: 66.

- (2) Coward, K. H., and Drummond, J. C. 1922. Biochem. Jour. 16: 631-636.
E. S. R. 48: 864.

FISH ROE. See FISH

(1) See COD ROE

(2) See FISH (2)

FISH OILS AND FISH LIVER OILS

Zilva, S. S., and Drummond, J. C. 1922. *Lancet* [London]. i: 1243.

E. S. R. 47: 768.

FLOUR. See WHEAT BRAN AND EMBRYO

GRAPEFRUIT

Morgan, A. F., and Chaney, M. S. 1924. *Amer. Jour. Physiol.* 68: 397-406.

E. S. R. 51: 666.

HEART, PIG

Osborne, T. B., and Mendel, L. B. 1918. *Jour. Biol. Chem.* 34: 17-27.

E. S. R. 39: 873.

HERRING. See COD ROE

HERRING OIL. See COD ROE

HONEY

Hawk, P. B., Smith, C. A., and Bergein, O. 1921. *Amer. Jour. Physiol.*

55: 339-348. E. S. R. 45: 665.

HORSE FAT. See COTTONSEED OIL

KIDNEY

(1) See HEART

(2) Sherman, H. C., and Boynton, L. C. 1925. *Jour. Amer. Chem. Soc.*

47: 1646-1653. E. S. R. 54: 89

LAMB MUSCLE. See BEEF MUSCLE

LARD

(1) Drummond, J. C., Golding, J., Zilva, S. S., and Coward, K. H. 1920.

Biochem. Jour. 14: 742-753. E. S. R. 45: 566.

(2) Mallon, M. G., and Clark, M. 1922. *Jour. Biol. Chem.* 54: 763-766.

E. S. R. 49: 59.

LEMON. See GRAPEFRUIT

LEMON OIL AND PEEL

Morgan, A. F. 1923. *Amer. Jour. Physiol.* 64: 522-537. E. S. R. 50: 59.

LENTILS

Jones, D. B., and Murphy, J. C. 1924. *Jour. Biol. Chem.* 59: 243-253.

E. S. R. 51: 665.

LETTUCE

(1) See CHARD, SWISS

(2) See APPLES

LINSEED OIL. See CORN OIL

LIVER. See KIDNEY (2)

LUNGS. See KIDNEY (2)

LUNG FAT

Roger, H., Binet, L., and Vagliano, M. 1924. *Compt. Rend. Soc. Biol.*

[Paris] 90: 1310-1311. E. S. R. 53: 367.

MALT, GREEN. See BACON

MALT, KILNED. See BARLEY (2)

MANGELS. See BEET ROOT

MARGARIN, OLEO. See COTTONSEED OIL, HYDROGENATED

MARGARIN, NUT. See COTTONSEED OIL, HYDROGENATED

MEAT, LEAN (MUSCLE). See KIDNEY (2)

MILK, COW'S, WHOLE, RAW

(1) See BUTTER (2)

(2) See APPLES

MILK, COW'S, SKIM, RAW. See CREAM

MILK, COW'S, WHOLE, DRIED

- (1) Sherman, H. C., Rouse, M. E., Allen, B., and Woods, E. 1921. Jour. Biol. Chem. 46: 503-519. E. S. R. 45: 864.

(2) See APPLES

MILK, COW'S, SKIM, DRIED

- Sherman, H. C., MacLeod, F. L., and Kramer, M. M. 1920. Proc. Soc. Expt. Biol. Med. 18: 41-43. E. S. R. 45: 366.

MILK, HUMAN

- Pringle, H. 1925. Proc. Roy. Dublin Soc. 18: 93-97. E. S. R.

MILLET

- Steenbock, H., Sell, M. T., and Jones, J. H. 1923. Jour. Biol. Chem. 56: 345-354. E. S. R. 50: 364.

MUSHROOMS, DRIED

- Hara, S. 1923. Biochem. Ztschr. 142: 79-100. E. S. R. 50: 856.

MUTTON FAT. See COTTONSEED OIL

OAT KERNEL

- McCollum, E. V., Simmonds, N., and Pitz, W. 1917. Jour. Biol. Chem. 29: 341-354. E. S. R. 37: 61.

OILS, HYDROGENATED

- Drummond, J. C. 1919. Jour. Physiol. 52: 344-346. E. S. R. 41: 362.

OILS, FISH LIVER. See COD LIVER OIL (2)

OILS, VEGETABLE. See CORN OIL

OLIVE OIL

- McCollum, E. V., Simmonds, N., and Pitz, W. 1916. Amer. Jour. Physiol. 41: 361-375. E. S. R. 36: 61.

ONIONS

- (1) Hume, E. M. 1921. Biochem. Jour. 15: 30-48. E. S. R. 45: 866.

(2) See BACON

ORANGE JUICE

- (1) Osborne, T. B., and Mendel, L. B. 1922. Proc. Soc. Expt. Biol. and Med. 19: 187-188. E. S. R. 47: 465.

(2) See CAPSICUM

(3) See APPLES

ORANGE JUICE, CONCENTRATED. See LEMON OIL AND PEEL

ORANGE PEEL. See LEMON OIL AND PEEL

ORANGE PEEL OIL. See LEMON OIL AND PEEL

PALM OIL. See CORN OIL

PALM KERNEL OIL. See CORN OIL

PAPAYA (PAWPAW). See AVOCADO

PARSNIP. See BEET ROOT

PEANUT. See ALMONDS

PEANUT OIL. See CORN OIL

PEAS

- Eddy, W. H., Kohman, E. F., and Carlsson, V. 1925. Indus. and Engin. Chem. 18: 85-89.

PECAN

- Salmon, W. D., and Livingston, C. W. 1925. Jour. Home Econ. 17: 129-135. E. S. R. 54: 90

PIG KIDNEY FAT. See LARD (1)

PINEAPPLE

- Miller, C. D. 1924. Jour. Home Econ. 16: 18-26. E. S. R. 51: 167.

PINE NUT. See BACON

FORK

- (1) Wright, A. M. 1923. Jour. Soc. Chem. Indus. 42: 509T. E. S. R. 51: 268.

(2) See BEEF MUSCLE

POTATO, SWEET. See BEET ROOT

POTATO, WHITE

(1) See BEET ROOT

(2) See CABBAGE (1)

(3) See APPLES

PRUNES. See BACON

PUMPKIN

Morgan, A. F., and Francis, L. D. 1924. Amer. Jour. Physiol. 69: 67-77. E. S. R. 52: 762.

RADISH

Morgan, A. F. 1924. Amer. Jour. Physiol. 69: 634-637. E. S. R. 53: 62.

RAISINS

Dutcher, R. A., and Outhouse, J. 1923. Pennsylvania Sta. Bul. 181: 18.

E. S. R. 50: 463.

RICE, UNPOLISHED

Guerrero, L. E., and Concepcion, I. 1920. Philippine Jour. Sci. 17: 99-103. E. S. R. 45: 669.

RICE, POLISHED

McCollum, E. V., and Davis, L. 1915. Jour. Biol. Chem. 23: 181-230.

E. S. R. 34: 367.

RICE, WILD

Kennedy, C. 1924. Jour. Agr. Research. [U. S.] 27: 219-224. E. S. R. 51: 163.

ROE, FISH. See COD ROE

RUTABAGA (SWEDDE). See CAPSICUM

SAFODILLA (CHICO). See AVOCADO

SAUERKRAUT. See BACON

SEAL OIL

Delf, E. M. 1924. Biochem. Jour. 18: 93-100. E. S. R. 51: 565.

SEEDS (OIL-BEARING). See CORN OIL

SESAME OIL. See SEAL OIL

SHRIMPS. See COD ROE

SOYBEAN OIL. See CORN OIL

SPINACH

(1) See CABBAGE (1)

(2) Eddy, W. H., Kohman, E. F., and Carlsson, V. 1925. Indus. and Engin. Chem. 17: 69-74. E. S. R. 53: 764.

(3) See APPLES

SQUASH, HUBBARD. See CHARD

SWEETBREADS. See BREAD

TOMATOES

(1) See CARROTS (1)

(2) See APPLES

TURNIP. See BACON

WALNUTS, ENGLISH

Mignon, H. L. 1923. Amer. Jour. Physiol. 66: 215-231. E. S. R. 50: 462.

WHALE OIL. See SEAL OIL

WHEAT BRAN

Stammers, A. D. 1921. Biochem. Jour. 15: 489-493. E. S. R. 46: 256.

WHEAT EMBRYO

McCollum, E. V., Simmonds, W., and Pitz, W. 1916. Jour. Biol. Chem. 25: 105-131. E. S. R. 35: 265.

YEAST

Luce, E. M., and MacLean, I. S. 1925. Biochem. Jour. 19: 47-51. E. S. R. 53: 502.

LITERATURE REFERENCES ON THE OCCURRENCE OF VITAMIN B

ALMONDS

Cajori, F. A. 1920. Jour. Biol. Chem. 43: 583-606. E. S. R. 44: 461.

APPLES

Osborne, T. B., and Mendel, L. B. 1920. Jour. Biol. Chem. 42: 465-489. E. S. R. 43: 765.

ARTICHOKES, GLOBE

Santos, F. O. 1922. Amer. Jour. Physiol. 59: 310-334. E. S. R. 47: 465.

ASPARAGUS

Osborne, T. B., and Mendel, L. B. 1922. Jour. Amer. Med. Assoc. 78: 1121-1122. E. S. R. 47: 267.

AVOCADO (ALLIGATOR PEAR). See ARTICHOKES, GLOBE

BACON

Sherman, H. C. Food Products. 2nd ed. 1924.

BAMBOO SHOOTS. See ARTICHOKES, GLOBE

BANANAS

Acuña, E. M. 1923. Philippine Agr. 12: 293-302. E. S. R. 51: 666.

BARLEY

(1) Steenbock, H., Kent, H. E., and Gross, E. G. 1918. Jour. Biol. Chem. 35: 61-74. E. S. R. 39: 666.

(2) Southgate, H. W. 1924. Biochem. Jour. 18: 769-776. E. S. R. 52: 365.

(3) Harden, A., and Zilva, S. S. Biochem. Jour. 1924. 18: 1129-1132. E. S. R. 52: 564.

BEANS, KIDNEY. See BACON

BEANS, MUNG. See ARTICHOKES, GLOBE

BEANS, NAVY

(1) McCollum, E. V., Simmonds, W., and Pitz, W. 1917. Jour. Biol. Chem. 29: 521-536. E. S. R. 37: 163.

(2) Daniels, A. L., and McClurg, N. L. 1919. Jour. Biol. Chem. 37: 201-213. E. S. R. 40: 565.

BEANS, SOY

Osborne, T. B., and Mendel, L. B. 1917. Jour. Biol. Chem. 32: 369-387. E. S. R. 39: 667.

BEANS, STRING. See BEANS, KIDNEY

BEECHNUT. See BACON

BEEF MUSCLE

(1) Osborne, T. B., and Mendel, L. B. 1917. Jour. Biol. Chem. 32: 309-323. E. S. R. 39: 665.

(2) Hoagland, R. 1923. U. S. Dept. Agr. Bul. 1138. E. S. R. 49: 63.

BEET ROOT

Osborne, T. B., and Mendel, L. B. 1920. Jour. Biol. Chem. 41: 451-468. E. S. R. 42: 759.

BEET, STEMS AND LEAVES

Osborne, T. B., and Mendel, L. B. 1919. Jour. Biol. Chem. 39: 29-34.
E. S. R. 41: 762.

BRAINS

Osborne, T. B., and Mendel, L. B. 1918. Jour. Biol. Chem. 34: 17-27.
E. S. R. 39: 873.

BRAZIL NUTS. See ALMONDS.

BREAD, WHITE, WATER

Hartwell, G. A. 1924. Biochem. Jour. 18: 120-126. E. S. R. 51: 567.

BREAD, WHITE, MILK

Eddy, W. H. 1925. Jour. Home Econ. 16: 428.

BREAD, RYE

Hara, S. 1924. Biochem. Ztschr. 144: 52-59. E. S. R. 51: 368.

BUTTERMILK

Sherman, H. C., and Smith, S. L. The Vitamins. 1922.

CABBAGE

(1) See BEET ROOT

(2) Dunham, G. C. 1921. Military Surgeon 48: 223-234. E. S. R. 45: 765.

CARROTS

(1) See BEET ROOT

(2) See CABBAGE (2)

CAULIFLOWER. See BACONCELERY. See ASPARAGUSCHARD, SWISS. See BUTTERMILKCHESTNUTS. See ALMONDS

COCONUT PRESS CAKE

Johns, C. O., Finks, A. J., and Paul, M. S. 1919. Jour. Biol. Chem.
37: 497-502. E. S. R. 41: 262.

CORN, WHITE AND YELLOW

Croll, H. M., and Mendel, L. B. 1925. Amer. Jour. Physiol. 74: 674-694.

COTTONSEED MEAL

Osborne, T. B., and Mendel, L. B. 1917. Jour. Biol. Chem. 29: 289-317.
E. S. R. 37: 60.

COWPEAS. See BANANASCREAM. See BUTTERMILKCUCUMBERS. See BUTTERMILKDANDELION GREENS. See ASPARAGUS

DASHEENS

Steenbock, H., and Gross, E. G. 1920. Jour. Biol. Chem. 40: 501-532.
E. S. R. 42: 460.

EGGPLANT. See BACON

EGG YOLK

Osborne, T. B., and Mendel, L. B. 1923. Jour. Amer. Med. Assoc. 80:
302-303. E. S. R. 49: 161.

EGGS, WHOLE

Hoagland, R., and Lee, A. R. 1924. Jour. Agr. Research. [U. S.] 28:
461-472. E. S. R. 52: 161.

FILBERTS. See ALMONDS

FISH, FAT AND LEAN

Drummond, J. C. 1918. Jour. Physiol. 52: 95-109. E. S. R. 40: 66.

FLOUR, WHEAT

Bell, M., and Mendel, L. B. 1922. Amer. Jour. Physiol. 62: 145-161.
E. S. R. 47: 860.

GRAPE JUICE. See APPLES

GRAPEFRUIT. See APPLES

HEART, MUSCLE. See BRAINS

HICKORY NUTS. See ALMONDS

HONEY

Hawk, P. B., Smith, C. A., and Bergeim, C. 1921. Amer. Jour. Physiol. 55: 339-348. E. S. R. 45: 665.

KIDNEY. See BRAINS

LEMONS. See APPLES

LENTILS

Jones, D. B., and Murphy, J. C. 1924. Jour. Biol. Chem. 59: 243-253. E. S. R. 51: 665.

LETTUCE. See ASPARAGUS

LIME JUICE

Funk, C. 1912. Jour. Physiol. 45: 75-81. E. S. R. 27: 868.

LIVER

(1) Osborne, T. B., and Mendel, L. B. 1923. Jour. Biol. Chem. 58: 363-367. E. S. R. 51: 268.

(2) See BEEF MUSCLE (1) and (2)

MALT. See BARLEY (2) and (3)

MALT EXTRACT

Sieffert, L. 1922. Schweitz. Apoth. Ztg. 60: 301-305. E. S. R. 49: 663.

MANGELS. See DASHLENS

MEAT. See BEEF, PORK, ETC.

MEAT EXTRACT. See BEEF MUSCLE (1)

MEAT JUICE, BEEF. See BACON

MILK, COW'S, WHOLE, FRESH

(1) Johnson, J. M. 1921. Pub. Health Rpts., U. S. 36: 2044-2057. E. S. R. 46: 60

(2) Osborne, T. B., and Mendel, L. B. 1922. Biochem. Jour. 16: 363-367. E. S. R. 47: 861.

(3) Sherman, H. C., and Spohn, A. 1923. Jour. Amer. Chem. Soc. 45: 2719-2728. E. S. R. 51: 363.

MILK, COW'S, WHOLE, BOILED

Gibson, R. B., and Concepcion, I. 1916. Philippine Jour. Sci. Sect. B. 11: 119-133. E. S. R. 36: 665.

MILK, COW'S, WHOLE, CONDENSED

Rosenau, M. J. 1921. Boston Med. and Surg. Jour. 184: 455-458. E. S. R. 45: 867.

MILK, COW'S, WHOLE, DRIED. See MILK, WHOLE, FRESH (3)

MILK, COW'S, WHOLE, PASTEURIZED. See MILK, WHOLE, FRESH (1)

MILK, COW'S, SKIM, DRIED. See MILK, WHOLE, FRESH (1) and (3)

MILK, HUMAN. See BUTTERMILK

MILLET

McCollum, E. V. 1917. Jour. Amer. Med. Assoc. 68: 1379.

MOLASSES

Nelson, V. E., Heller, V. G., and Fulmer, E. I. 1925. Indus. and Engin. Chem. 17: 199-201. E. S. R. 53: 660.

MUSHROOMS

- (1) Orton, C. B., McCollum, E. V., and Simmonds, N. 1922. Jour. Biol. Chem. 53: 1-6. E. S. R. 48: 162.
- (2) Hara, S. 1923. Biochem. Ztschr. 142: 79-100. E. S. R. 50: 856.

MUTTON. See BEEF MUSCLE (2)

OATS

McCollum, E. V., Simmonds, N., and Pitz, W. 1917. Jour. Biol. Chem. 29: 341-354. E. S. R. 37: 61.

OKRA. See ARTICHOKE, GLOBE

ONION. See BILT STEMS AND LEAVES

ORANGE JUICE AND PEEL. See APPLES

PAPAYAS. See BANANAS

PARSLEY. See ASPARAGUS

PARSNIPS. See DASHEENS

PEANUTS

- (1) Daniels, A. L., and Loughlin, R. 1918. Jour. Biol. Chem. 33: 295-301. E. S. R. 39: 471.
- (2) Johns, C. C., and Finks, A. J. 1920. Jour. Biol. Chem. 42: 569-579. E. S. R. 43: 763.

PEARS. See APPLES

PEAS, GREEN, FRESH, HOME-COOKED, AND CANNED

Eddy, W. H., Kohman, E. F., and Carlsson, V. 1925. Indus. and Engin. Chem. 18: 85-89. E. S. R.

PECANS

Salmon, W. D., and Livingston, C. W. 1925. Jour. Home Econ. 17: 129-135. E. S. R. 54: 90

PERSIMMONS, CHINESE

Med. Research Council [Gt. Brit.] Spec. Rpt. Ser. No. 38. 2nd ed. 1924.

PINEAPPLES

Miller, C. D. 1924. Jour. Home Econ. 16: 18-26. E. S. R. 51: 167.

PORK

Hoegland, R. 1924. Amer. Jour. Physiol. 67: 300-308. E. S. R. 50: 859.

POTATOES, SWEET. See DASHEENS

POTATOES, WHITE

- (1) See DASHEENS
- (2) See BEET ROOT

POULTRY. See EGGS, WHOLE

PRUNES. See APPLES

PUMPKIN

Morgan, A. F., and Francis, L. D. 1924. Amer. Jour. Physiol. 69: 67-77. E. S. R. 52: 762.

RADISH

Morgan, A. F. 1924. Amer. Jour. Physiol. 69: 634-637. E. S. R. 53: 62.

RAISINS

Dutcher, R. A., and Outhouse, J. 1923. Pennsylvania Sta. Bul. 181: 18. E. S. R. 50: 463.

RICE

McCollum, E. V., and Davis, H. 1915. Jour. Biol. Chem. 23: 181-230. E. S. R. 34: 367.

RICE, POLISHINGS (EXTRACT)

Santos, F. O., and Collado, E. G. 1925. Philippine Agr. 14: 243-245. E. S. R.

RICE, WILD

Kennedy, C. 1924. Jour. Agr. Research [U. S.] 27: 219-224. E. S. R. 51: 163.

RUTABAGA. See DASHEENS

RYE. See BREAD, RYE

SAUERKRAUT. See BACON

SPINACH

(1) See BEET ROOT

(2) Eddy, W. H., Kohman, E. F., and Carlsson, V. 1925. Indus. and Engin. Chem. 17: 69-74. E. S. R. 53: 764.

STRAWBERRIES. See MILK, WHOLE, DRIED (1)

SWEDE. See RUTABAGA

SWEETBREADS. See BUTTERMILK

TOMATOES

(1) See BEET ROOT

(2) Sherman, H. C., and Grose, M. R. 1923. Jour. Amer. Chem. Soc. 45: 2728-2738. E. S. R. 51: 461.

TURNIPS

(1) See BEET ROOT

(2) See CABBAGE (2)

WALNUTS. See ALMONDS

WHEAT. See FLOUR, WHEAT

WHEAT GERM, EXTRACT

Hoffman, C. 1925. Indus. and Engin. Chem. 17: 498-503. E. S. R. 53: 865.

YEAST, BAKER'S AND BREWER'S

Kennedy, C., and Palmer, L. S. 1922. Jour. Biol. Chem. 54: 217-232. E. S. R. 48: 759.

LITERATURE REFERENCES ON THE OCCURRENCE OF VITAMIN C

APPLES

(1) Givens, M. H., McCluggage, H. B., and Van Horne, E. G. 1922. Amer. Jour. Diseases Children 23: 210-225. E. S. R. 47: 268.

(2) Kohman, E. F., Eddy, W. H., and Carlsson, V. 1924. Indus. and Engin. Chem. 16: 1261-1263. E. S. R. 53: 566.

BANANAS

(1) See APPLES (1)

(2) Embrey, H. 1923. Philippine Jour. Sci. 22: 77-82. E. S. R. 49: 563.

BARLEY

(1) Southgate, H. W. 1924. Biochem. Jour. 18: 769-776. E. S. R. 52: 365.

(2) Harden, A., and Zilva, S. S. Biochem. Jour. 18: 1129-1132. E. S. R. 52: 564.

BARLEY, SPROUTED

McClendon, J. F., Cole, W. C. C., Engstrand, O., and Middlekauff, J. E. 1919. Jour. Biol. Chem. 40: 243-258. E. S. R. 42: 463.

BEANS, SPROUTED

Wiltshire, H. N. 1912. Lancet [London]. 1918. II: 811-813. E. S. R. 41: 861.

BEANS, MUNG, SPROUTED

Santos, F. O. 1922. Amer. Jour. Physiol. 59: 310-334. E. S. R. 47: 465.

BEANS, SOY

Cohen, B., and Mendel, L. B. 1918. Jour. Biol. Chem. 35: 425-453. E. S. R. 39: 770.

BEANS, SOY, SPROUTED

Delf, E. M. 1921. So. African Inst. Med. Research Pub. 14. Abridged in Lancet [London]. 1922. I: 576-579. E. S. R. 47: 568; 50: 64.

BEANS, STRING

Campbell, M. E. D., and Chick, H. 1919. Lancet [London]. 1919. II: 320-323. E. S. R. 42: 163.

BEEF, RAW, LEAN

Dutcher, R. A., Pierson, E. M., and Biester, A. 1920. Jour. Biol. Chem. 42: 301-310. E. S. R. 43: 664.

BEETS

Wisconsin Sta. Bul. 1922. 339: 123-124. E. S. R. 47: 464.

BUTTERMILK

Sherman, H. C., and Smith, S. L. The Vitamins. 1922.

CABBAGE

(1) Delf, E. M. 1918. Biochem. Jour. 12: 416-447. E. S. R. 41: 167.

(2) See BEETS

(3) Eddy, W. H., and Kohman, E. F. 1924. Indus. and Engin. Chem. 16: 52-53. E. S. R. 51: 462.

CARROTS

(1) Hess, A. F., and Unger, L. J. 1919. Proc. Soc. Expt. Biol. and Med. 16: 52-53. E. S. R. 41: 266.

(2) See BEETS

CAULIFLOWER

Holst, A., and Frölich, T. 1912. Ztschr. Hyg. u. Infektionskrank. 72: 1.

CHICO (SAPODILLA)

Embrey, H. 1923. Philippine Jour. Sci. 22: 77-82. E. S. R. 49: 563.

COWPEAS, SPROUTED. See BEANS, SOY, SPROUTEDCRANBERRY JUICE. See CAULIFLOWERCREAM. See BUTTERMILKCRESS, WATER. See BUTTERMILKCUCUMBERS. See CHICODANDELIONS. See CAULIFLOWERDASHEEN. See BUTTERMILK

EGGPLANT

Med. Research Council [Gt. Brit.] Spec. Rpt. Ser. No. 38. 2nd ed. 1924.

EGGS

Hauge, S. M., and Carrick, C. W. 1925. Jour. Biol. Chem. 64: 111-112. E. S. R. 53: 768.

ENDIVE. See CAULIFLOWER

GRAPE JUICE

Chick, H., and Rhodes, M. 1918. Lancet [London]. 1918. II: 774-775. E. S. R. 41: 860.

GRAPE JUICE, DRIED

Givens, M. H., and Macy, I. G. 1921. Jour. Biol. Chem. 46: xi-xii. E. S. R. 46: 359.

GRAPEFRUIT, FRESH. See CHICOGRAPEFRUIT JUICE, DRIED. See GRAPE JUICE, DRIEDGUAVA. See BANANAS (2)HEART. See BUTTERMILK

HONEY

Faber, H. K. 1920. Jour. Biol. Chem. 43: 113-116. E. S. R. 44: 63.

KIDNEY. See BUTTERMILK

KOHLRABI. See CAULIFLOWER

LACTIC-ACID MILK. See EGGPLANT

LEGUMES, SPROUTED

Chick, H., and Hume, E. M. 1917. Jour. Roy. Army Med. Corps 29: 121-159. E. S. R. 40: 868.

LEMONS, FRESH AND STORED

(1) Davey, A. J. 1921. Biochem. Jour. 15: 83-103. E. S. R. 45: 869.

(2) Delf, E. M. 1925. Biochem. Jour. 19: 141-152. E. S. R. 53: 567.

LEMON JUICE, CONCENTRATED

Zilva, S. S. 1924. Biochem. Jour. 18: 186-187. E. S. R. 51: 568.

LEMON JUICE, DRIED. See GRAPE JUICE, DRIED

LENTILS, SPROUTED

Chick, H., and Delf, E. M. 1919. Biochem. Jour. 13: 199-218. E. S. R. 42: 57.

LETTUCE. See CAULIFLOWER

LIME JUICE

(1) See LEMON JUICE, FRESH

(2) Robison, R. 1919. Jour. Roy. Army Med. Corps 32: 48-56. E. S. R. 41: 470.

LIVER

(1) Lepkovsky, S., and Nelson, M. T. 1924. Jour. Biol. Chem. 59: 91-96.

(2) Carrick, C. W., and Hauge, S. M. 1925. Jour. Biol. Chem. 63: 115-122.

MALT, GREEN

McClendon, J. F., and Cole, W. C. C. 1919. Amer. Jour. Physiol. 49: 145-146. E. S. R. 41: 561.

MALT, KILNED. See BARLEY (1) and (2)

MANGELS. See BEETS

MANGO, DRIED

Chick, H., Hume, E. M., and Skelton, R. F. 1919. Lancet [London]. 1919. II: 322-323. E. S. R. 42: 163.

MEAT JUICE, RAW

Willcox, W. H. 1920. Brit. Med. Jour. No. 3081: 73-77. E. S. R. 43: 263.

MEAT (MUSCLE). See BEEF, RAW

MILK, COW'S, RAW, PASTEURIZED, CONDENSED, DRIED, ETC.

Cavanaugh, G. W.; Dutcher, R. A., and Hall, J. S. 1924. Indus. and Engin. Chem. 16: 1070-1073. E. S. R. 53: 165.

MILK, GOAT'S

(1) Hunt, C. H., and Winter, A. R. 1922. Science 56: 114.

(2) Meyer, L. F., and Nassau, E. 1924. Klin. Wchnchr. 3: 2132-2135.

MILK, HUMAN

Meyer, L. F., and Nassau, E. 1925. Klin. wchnchr. 4: 2380-2383.

MULBERRIES. See CAULIFLOWER

MUSHROOMS

Steidle, H. 1924. Biochem. Ztschr. 151: 181-186. E. S. R. 53: 62.

OATS, SPROUTED. See BEANS, SOY

ONIONS. See LEGUMES, SPROUTED

ORANGES, FRESH AND STORED

(1) See BEANS, SOY, SPROUTED

(2) See LEMONS, FRESH (2)

ORANGE JUICE, CONCENTRATED

(1) Goss, H. 1925. Hilgardia [California Sta]. 1: 15-34. E. S. R.

(2) Priston, J. L. 1926. Jour. Roy. Naval Med. Serv. 12: 1-20.

ORANGE JUICE, DRIED. See GRAPE JUICE, DRIED

ORANGE PEEL, FRESH AND DRIED

Hess, A. F., and Unger, L. J. 1918. Jour. Biol. Chem. 35: 479-496.

E. S. R. 39: 771.

OYSTERS

Randoin, L. 1923. Compt. Rend. Acad. Sci. [Paris] 177: 498-501.

E. S. R. 50: 465.

PAPAYA (PAWPAW)

(1) See BEANS, SOY, SPROUTED

(2) See BANANAS (2)

PEACHES. See BEANS, SOY, SPROUTED

PEAS, GREEN, FRESH, HOME-COOKED, CANNED

Eddy, W. H., Kohman, E. F., and Carlsson, V. 1925. Indus. and Engin.

Chem. 18: 85-89. E. S. R.

PEAS, SPROUTED. See LENTILS, SPROUTEDPERSIMMONS, CHINESE. See BANANAS (2)

PINEAPPLES, FRESH

(1) See BEANS, SOY, SPROUTED

(2) See PINEAPPLE, CANNED

PINEAPPLE, CANNED

Miller, C. D. 1925. Jour. Home Econ. 17: 377-382. E. S. R.

POTATOES, SWEET. See BEANS, SOY, SPROUTED

POTATOES, WHITE

(1) See CAULIFLOWER

(2) See BEETS

PRUNES, DRIED. See ORANGE PEELPUMPKIN. See BEANS, SOY, SPROUTED

RAISINS

Dutcher, R. A., and Outhouse, J. 1923. Pennsylvania Sta. Bul. 181: 18.

E. S. R. 50: 463.

RASPBERRIES. See CAULIFLOWERRASPBERRY JUICE, DRIED. See GRAPE JUICE, DRIED

RHUBARB

Pierson, E. M., and Dutcher, R. A. 1920. Science 51: 70.

RUTABAGAS (SWEDS)

(1) Delf, E. M. 1920, 1925. Biochem. Jour. 14: 211-228; 19: 141-152.

E. S. R. 43: 567; 53: 567.

(2) See BEETS

SAFODILLA. See CHICO

SPINACH

Eddy, W. H., Kohman, E. F., and Carlsson, V. 1925. Indus. and Engin.

Chem. 17: 69-74. E. S. R. 53: 764.

STRAWBERRIES

Smith, C. A., Bergheim, O., and Hawk, P. B. 1921. Proc. Soc. Expt.

Biol. and Med. 19: 22. E. S. R. 46: 667.

TAMARIND, DRIED. See MANGO, DRIEDTANGERINE. See BEANS, SOY, SPROUTEDTOGI. See BEANS, MUNG, SPROUTED

TOMATOES, FRESH AND CANNED

(1) Sherman, H. C., LaMer, V. K., and Campbell, H. L. 1922. Jour. Amer. Chem. Soc. 44: 165-181. E. S. R. 46: 865.

(2) Delf, E. M. 1924. Biochem. Jour. 18: 674-678. E. S. R. 52: 863.

TOMATO JUICE, DRIED. See GRAPE JUICE, DRIED

TURNIPS. See BEETS

VEGETARIAN MARROW. See BEANS, SOY, SPROUTED

REFERENCES TO LITERATURE ON THE TECHNIQUE OF VITAMIN STUDIES

Drummond, J. C., and Watson, A. F. 1922. The testing of foodstuffs for vitamins. Analyst 47: 235-244. E. S. R. 48: 12.

Dutcher, R. A., and Francis, E. 1924. Vitamin studies. X. Feeding technique in vitamin studies. Proc. Soc. Expt. Biol. and Med. 21: 189-193. E. S. R. 51: 460.

Ferry, E. L. 1920. Nutrition experiments with rats. A description of methods and technic. Jour. Lab. and Clin. Med. 5: 735-745. E. S. R. 44: 462.

Holmes, A. D. 1923. Studies of the vitamin potency of cod liver oils. IV. To what extent is quantitative estimation of vitamin A possible? Jour. Metabolic Research 3: 583-587. E. S. R. 50: 858.

Osborne, T. B., and Mendel, L. B. 1921. A critique of experiments with diets free from fat-soluble vitamin. Jour. Biol. Chem. 45: 277-288. E. S. R. 45: 264.

Osborne, T. B., and Mendel, L. B. 1922. Quantitative aspects of the rôle of vitamin B in nutrition. Jour. Biol. Chem. 54: 739-752. E. S. R. 49: 62.

Osborne, T. B., and Mendel, L. B. 1925. The rôle of vitamin B in the relation to the size of growing rats. Jour. Biol. Chem. 63: 233-238. E. S. R. 53: 566.

Seidell, A. 1923. A physiological test for the activity of vitamin preparations. U. S. Pub. Health Rpts. 37: 1519-1523. E. S. R. 48: 12.

Sherman, H. C., and Grose, M. R. 1923. A quantitative study of the destruction of vitamin B by heat. Jour. Amer. Chem. Soc. 45: 2728-2738. E. S. R. 51: 461.

Sherman, H. C., and Kramer, M. M. 1924. Experiments upon vitamin A. Jour. Amer. Chem. Soc. 46: 1055-1063.

Sherman, H. C., and Munsell, H. E. 1925. The quantitative determination of vitamin A. Jour. Amer. Chem. Soc. 47: 1639-1646. E. S. R. 54: 89.

Sherman, H. C., and Smith, S. L. 1922. The vitamins, p. 72-78; 142-150; 176-179.

Sherman, H. C., and Spohn, A. 1923. A critical investigation and an application of the rat-growth method for the study of vitamin B. Jour. Amer. Chem. Soc. 45: 2719-2728. E. S. R. 51: 368.

Sherman, H. C., LaMer, V. K., and Campbell, H. L. 1922. The quantitative determination of the antiscorbutic vitamin (vitamin C). Jour. Amer. Chem. Soc. 44: 165-172. E. S. R. 46: 865.

Steenbock, H., Nelson, M. T., and Black, A. 1924. Fat-soluble vitamins. XX. A modified technique for the determination of vitamin A. Jour. Biol. Chem. 62: 275-286. E. S. R. 52: 804.

Steenbock, H., Sell, H. T., and Nelson, E. M. 1923. Vitamin B. I. A. modified technique in the use of the rat for determination of vitamin B. II. Storage of vitamin B by the rat. Jour. Biol. Chem. 55: 399-419. E. S. R. 49: 665.

Zilva, S. S., and Miura, M. 1921. The quantitative estimation of the fat-soluble factor. Biochem. Jour. 15: 654-659. E. S. R. 46: 906.





